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# A Comparison of Traditional and Online Instruction in an Introduction to Special Education Course

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**Abstract:** *There has been a proliferation of college courses and programs offered via distance education and particularly via the Internet (online). Although there is evidence that distance education using video conferencing or off-campus classes is effective, there is insufficient research addressing the online classes. Much of the existing research has investigated perceptions rather than outcomes. In contrast, this research presents a comparison of performance of candidates in introductory special education classes presented in traditional and online formats. Pretests and posttests of course content and attitudes toward inclusion, and rubric scores from three performance products were used to compare the outcomes in the course. The results support the "no significant difference" phenomenon and the use of distance education as a valid mechanism for delivery of teacher education.*

Projected population growth and the changing needs of the adult learner population have increased demands for alternatives to face-to-face, on-campus educational opportunities. These needs coupled with severe teacher shortages in many areas of the country have expanded this demand to include teacher preparation opportunities as well. In response to these demands there has been tremendous growth in the number of college courses and programs offered via distance education and particularly via the Internet (online). The impact of this growth on the quality and effectiveness of online instruction is a concern for many education professionals. In the field of special education, research investigating the outcomes of online instruction has begun and initial findings are positive. The purpose of this research was to add to that existing research by reporting on a study that measured outcomes in knowledge, skills, and dispositions to compare the effectiveness of an online and a

traditional presentation of introductory special education classes.

The demand for distance learning has been addressed in the literature for several years. Generically, distance learning has been seen as an answer to population growth, institutional competition, and changing learner needs. Broad (1997) and Daniel (1996) both addressed the impact of population growth on the capacity of universities to provide access to learning opportunities. Distance learning, which provides flexibility in time and place of delivery, provides a solution to the increased need for educational access. It also addresses the changing nature of the student population that includes more working adults and lifelong learners who require alternatives to traditional class schedules on campus, and on-demand education (Willis, Tucker, & Gunn, 2003). Instituting information technology solutions to address the rapid growth has also been viewed as a cost effective way for traditional universities to

## Traditional-Online Comparison

Steinweg, Davis & Thomson

maintain their competitive edge and solvency (Daniel & Cox, 2002; Fisher & Nygren, 2000; Nair, 2003).

In special education, the demand for distance instruction arose from somewhat different needs. Spooner, Spooner, Algozzine and Jordan (1998) noted that the severe teacher shortages of the late 1990's created a demand for "creative, practical, and productive personnel preparation programs" (p.122). Distance education specifically addressed the need for teacher preparation programs in rural areas (Grugenhagen, McCracken & True, 1999; Knapczyk, Chapman, Rodes, & Chung, 2001).

Evidence suggests that the demand for distance education is being answered by the country's universities. Comparisons of the data from the 1997-1998 and the 2000-2001 National Center for Education Statistics (NCES) reports on *Distance Education at Postsecondary Education Institutions* show increases in the number of courses and programs offered (Lewis, Snow, Farris, & Levin, 1999; Waits & Lewis, 2003). During the 1997-98 school year only about 1/3 of the nation's 2-year and 4-year institutions offered any distance education courses. In 2000-2001, over 1/2 of the institutions reported that they were offering distance education courses. This growth was accompanied by increases in enrollments (1,661,100 to 3,077,000) and in the number of separate or different course offerings (54,470 to 127,400). While separate course offerings address the needs of some distance learners, others need to have entire programs available. The NCES data suggest that this need is being addressed as well. The percent of institutions that have degree or certificate programs which can be completed entirely through distance instruction increased from 8% to 19% in this same period.

This growth in distance education is reflected as well in the delivery of instruction in special education. Programs for providing distance education for special education teachers have included telecourses (Cooke & deBettencourt, 2001); programs that combined interactive television, video conferencing, and web-based activities (Caro, McLean, Browning, & Hains, 2002; Griffin-Shirley, Almon, & Kelley, 2002); and programs de-

livered completely online (Ferrell, Persichitte, Lowell, & Roberts, 2001).

Although the growth and change in distance instruction has enabled the special education field to address the needs of dispersed learners, there are still concerns about the quality of the learners' experiences. Distance education methodology has evolved from early correspondence courses to interactive video conferencing to the increasingly popular web-based learning opportunities (Kaufman & Watkins, 2000). In the process it has facilitated the transmission of course content across space and time, but has also created distance between the learner and the instructor. Ludlow (2001) noted that, "Technology-mediated instructional activities sometimes replace interactions between an instructor and learners and among learners, with independent, isolated learning activities." (p. 144). There are concerns that many students learn best through direct interaction with the professor and other students, and that the impersonal nature of distance education may be a disadvantage (Beard & Harper, 2002).

Whether these and other perceived disadvantages impact the quality of distance education has been the topic of much research. Spooner, Jordan, Algozzine, and Spooner (1999) summarized the existing research in distance education using interactive technology and found no differences between distance and traditional classes in cognitive measures. In reviews of comparative studies, Russell (2001) and Saba (2000) found that there does not appear to be a difference between the effectiveness of distance and traditional presentations of courses. In another review of the literature which focused specifically on research related to online instruction, Ramage (2001) found similar results but cautioned that the multitude of variables which influence learning and cognition may prohibit a definitive answer to the question of which methodology is most effective.

While the debate continues, higher education institutions and teacher preparation programs are still confronted with documenting the comparability of their distance education programs (Western Cooperative for Educational Telecommunications, 2000). Recent studies in special education address-

**TESE, Volume 28, No. 1**  
Winter 2005

ing the effectiveness of online instruction have focused on student perceptions and satisfaction with their instruction (Beard & Harper, 2002; Ludlow, Foshay, Brannan, Duff & Dennison, 2002); the effectiveness of web-based methodologies embedded in traditional or off-campus sites (Andrews, 2002; Blackhurst, Hales & Lahm, 1998; Lock, 2001; Pindiprolu, Peterson, Rule, & Lignugaris/Kraft, 2003;) and the comparison of quiz scores between an online and an on-campus special education class (Caywood & Duckett, 2003,). Table 1 presents a summary of the features of studies addressing the use of online activities in special education courses. These research studies begin to address the issues surrounding online instruction in special education but most have focused on students' perceptions or satisfaction rather than outcomes. More research is needed that determines student outcomes in order to more fully address the effectiveness of online classes in special education.

### Method

The purpose of this research study was to compare the effectiveness of both online and traditional presentations of an introductory special education course at East Carolina University. The study investigated student performance on measures of knowledge, skills, and dispositions in comparing the effectiveness of the online and traditional presentations of the class.

### Course Description

The class, Introduction to Exceptional Children, engaged students in the exploration of information about exceptionality and special education, legislation and litigation, current trends and issues, multicultural and bilingual aspects of special education, individualized education programs, and disability categories. The purpose of the class was to provide a survey of special education and the various disability categories, and to be a positive influence on participants' attitudes toward working with exceptional learners. Prior to the study, we aligned the course outlines, presentations, and assignments of the traditional and online versions of the class. We used the same texts for both classes,

which were conducted during the Fall 2002 semester. The first author, who had previously taught this class in both traditional and online formats, taught three sections for this study (one traditional and two online). The online class presentation was asynchronous and used the course management system Blackboard. All sections followed the same class calendar with the content divided into three units, each covering three to five chapters in the primary text, *Exceptional Learners: Introduction to Special Education* (Hallahan & Kauffman, 2003b) and a skills project. A typical class week involved the students' reading a chapter in the primary textbook, participating in class discussion (traditional or on the online discussion board), creating a poster, and working on unit projects.

The students in all sections completed similar assignments: readings, essay questions, case study discussions, creation of posters, IEP projects, visits to special schools or classes, and exams. The poster assignment involved the creation of a one-page presentation of the definition, prevalence, characteristics, identification, and educational programming for the disability category studied that week. The reports about the visits to programs serving exceptional learners included students' reflections on their experience and observation of principles discussed in the class. The case studies were used to help students apply the factual information in the primary text to situations in school settings. For eight of the disability categories studied, a case study was discussed in class or on the Discussion Board. These case studies came from *Case Studies about Children and Adolescents with Special Needs* (Halmhuber & Beauvais, 2002). Two additional case studies were unit projects that required students to submit written responses to specific questions about the situation. These case studies were selected from the *Clearinghouse of Special Education Teaching Cases* (<http://cases.coedu.usf.edu>) and *Cases for Reflection and Analysis for Exceptional Learners* (Hallahan & Kauffman, 2003a). The Individualized Education Plan (IEP) Project required the development of a simplified IEP for a student. This assignment involved identifying a K-12 student and then communicating with school professionals and reviewing the K-12 student's history to

**Traditional-Online Comparison**  
Steinweg, Davis & Thomson

**Table 1.** Research Involving the Use of Online Activities in Special Education Courses

Author(s) (date)	Course topic	Population	Presentation format	Comparison of online and f-2-f classes	End of course knowledge test
Andrews (2002)	Teaching Excep- tional Children (inclusion)	40 pre-service general educa- tion	Online enhanced		
Beard & Harper (2002)	Characteristics of Severe Disabil- ities	25 graduate	Hybrid—½ F2F and ½ online enhanced	Compared atten- dance between parts of class	
Blackhurst, Hales, & Lahm (1998)	Telecommuni- cations in Spe- cial Education and Rehabilita- tion	8 graduate	Online		X
Caro, McLean, Browning & Hains (2002)	Seminar in early childhood SPED	89 undergradu- ate, graduate, and related disciplines	Hybrid—Video- conferencing and online		
Caywood & Duck- ett (2003)	Behavior Man- agement	140 graduate 70 online 70 on campus	Online F2F	X	X
Lock (2001)	4 SPED courses	41 Graduate	Online		
Ludlow, Foshay, Brannan, Duff, Dennison (2002)	4 staff develop- ment courses	Staff develop- ment (N not given)	Online		X Application through au- thentic activi- ties
Pindiprolu, Peterson, Rule & Lignugar- is/Kraft (2003)	Part of a course —practice of Functional Be- havioral Assess- ment	79 preservice un- dergraduates All web-based 26 online 27 chat 26 group	Interactive TV F2F and online		
Steinweg, Davis, & Thomson (current study)	Introduction to Exceptional Children	54 graduate	F2F and online	Compared F2F and online presentation of same class	

obtain necessary information. A reflection component was also included in the IEP assignment. All class participants used the *Guide to Writing Quality Individualized Education Programs: What's Best for Students with Disabilities* (Gibb & Dyches, 2000) and the "What's Best for Matthew" compact disc (Egan, et al., 2001) as the guides for this assignment. A simplified IEP form was available in digital format for all of the class participants to use.

### Participants

A total of 54 students across three class sections participated in this study. The first group (n = 26) completed the traditional face-to-face section of the course. This class met for 3 hours once a week for 16 weeks. The second group (n = 28) consisted of 2 sections who completed the 16-week semester class online. Two online sections were used in order to have research groups of sim-

**TESE, Volume 28, No. 1**  
Winter 2005

**Table 1.** *Extended.*

Student opinion	Faculty opinion	Knowledge pre-test and post-test	Skills pre-test and post-test	Attitude pre-test and post-test	Results
X Student reflections and perceptions			X Adapted lesson plans before and after on-line feedback		—Elaborated accommodations as the result of feedback. —Students reported positive response to online component.
X					—Less attendance when notes available online —Students reported positive response to online option
X					Students expressed positive response to online presentation
X Self-report of technology use and knowledge gains	X				—Students reported increased technology skills, use of technology, and knowledge. —Faculty reported increased technology skills and professional growth. No significant difference in end of course test.
X					Students reported positive response to online courses
X	X				Positive response to online staff development
X		X (part of course)			No significant differences were found on assessment across the 3 methods of presentation.
		X	X	X	No significant differences in changes in knowledge, skills, or dispositions

ilar size. The special education program at East Carolina University has made a commitment to smaller online class sizes based on the literature that recognizes the increased time requirements for faculty teaching online (Clay, 1999; Visser, 2000). Information about the participants' backgrounds was gathered through a questionnaire distributed at the beginning of the course. The majority of the students who registered for this class were alternative licensure teachers and regular education teachers, who were working on initial licensure or license renewal. Consul-

tation with other special education faculty confirmed that this class composition was consistent with the population of students who typically register for this graduate level introductory special education course at our university.

Means, standard deviations, and obtained *t* statistics for the student characteristics are presented in Tables 2 through 4. No statistically significant differences were evident in the characteristics of the students who completed the traditional or the online version of the class (Table 2). The ages of

**Traditional-Online Comparison**  
Steinweg, Davis & Thomson

**Table 2.** Means, Standard Deviations and t-Statistics for Student Characteristics

Characteristic		Group		Obtained <i>t</i>
		Online n = 28	Traditional n = 26	
Age	M	32.8	33.16	-.14
	SD	7.68	11.49	
Completed an online course (No coded as 0, Yes coded as 1)	M	.46	.23	1.82
	SD	.51	.43	
Personal experience with students with disabilities (No coded as 0, Yes coded as 1)	M	.04	.08	-.62
	SD	.19	.27	
Currently working (No coded as 0, Yes coded as 1)	M	.89	.96	-.95
	SD	.32	.20	

*Note.* No differences significant at the .05 level.

students taking the class online ( $M = 32.8$ ,  $SD = 7.68$ ) were similar ( $t = -.14$ ,  $df = 51$ ,  $p > .05$ ) to those completing the traditional version of the class ( $M = 33.16$ ,  $SD = 11.49$ ). The students in the online section ( $M = .04$ ,  $SD = .19$ ) reported a similar level ( $t = -.619$ ,  $df = 51$ ,  $p > .05$ ) of prior personal experience with students with disabilities (SWDs) as the students in the traditional class ( $M = .08$ ,  $SD = .27$ ). The students' prior experiences with online classes were similar regardless of their current class type (Table 2). A similar portion of the students ( $t = 1.82$ ,  $df = 52$ ,  $p > .05$ ) had completed at least one online class in the current online section ( $M = .46$ ,  $SD = .51$ ) as had the students in the traditional class ( $M = .23$ ,  $SD = .43$ ). Of those who had completed an online course ( $n = 20$ ), students in the online section (Table 3) had completed a similar number of online courses ( $M = 2.23$ ,  $SD = 1.42$ ) as the traditional students ( $M = 2.0$ ,  $SD = 2.77$ ) prior to entering this class ( $t = .249$ ,  $df = 18$ ,  $p >$

.05). The work status (Table 2) and years of teaching experience (Table 4) were also equivalent for the two groups. The number of online students who were currently working ( $M = .89$ ,  $SD = .32$ ) was equivalent ( $t = .953$ ,  $df = 52$ ,  $p > .05$ ) to the number of students in the traditional group who were working ( $M = .96$ ,  $SD = .20$ ). Of those students who were currently teaching ( $n = 30$ ), the years of teaching experience for the online students ( $M = 2.25$ ,  $SD = 1.69$ ) was similar ( $t = -1.39$ ,  $df = 28$ ,  $p > .05$ ) to the years of experience of the students in the traditional version of the class ( $M = 5.0$ ,  $SD = 7.72$ ). The portion of students currently teaching ( $n = 30$ ) who had prior experience teaching students with disabilities was also similar ( $t = .085$ ,  $df = 29$ ,  $p > .05$ ) for the participants in the online section ( $M = .81$ ,  $SD = .40$ ) and the traditional section ( $M = .80$ ,  $SD = .41$ ) of the class.

### Dependent Variables

This investigation involved the collection and analysis of student performance data on two different pretest/posttest measures and three skill measures. The pretest/posttest measures included a knowledge test and an attitudinal assessment which students were told were for the purpose of evaluating the course. The pretests were mailed to the online students prior to the beginning of the class and were administered the first night of class for the traditional class. The posttests were mailed to the online students and completed in the traditional class during the last

**Table 3.** Means, Standard Deviations and t-Statistics for Characteristics of Students Completing an Online Course

Characteristic		Group		Ob- tained <i>t</i>
		Online n = 13	Tradi- tional n = 7	
# of online courses	M	2.23	2.0	.25
Completed	SD	1.42	2.77	

*Note.* No differences significant at the .05 level.



**TESE, Volume 28, No. 1**  
Winter 2005

**Table 4.** Means, Standard Deviations and t-Statistics for Characteristics of Students Currently Teaching

Characteristic		Group		Obtained <i>t</i>
		Online n = 16	Traditional n = 14	
Years teaching	M	2.25	5.0	-1.39
	SD	1.69	7.72	
Experience teaching students with disabilities (No coded as 0, Yes coded as 1)	M	.81	.80	.80
	SD	.40	.41	

*Note.* No differences significant at the .05 level.

class meeting. Students were advised to complete the measures to the best of their ability without resources and were assured that their results would not influence their grade in the course.

The first pretest/posttest measure was an assessment of the participants' knowledge. It consisted of 44 multiple-choice questions selected from the primary textbook's test bank. The questions focused on basic factual information from the chapters which would be covered in the class. The test items were distributed to faculty in the special education program who reviewed these questions and confirmed the validity of the items.

The second pretest/posttest measure, *Opinions Relative to Integration of Students with Disabilities* (Antonak & Larivee, 1995), was an assessment of the participants' dispositions. The 25 item assessment involved rating statements using a 6 point Likert-type scale ranging from a -3, *disagree very much*, to a +3, *agree very much*. The statements focused on perceptions or beliefs about inclusion of students with disabilities in the regular classroom. The items included negatively and positively worded statements to control for acquiescent responses. When completed and all ratings were summed, the instrument yields a score of 0-150 with higher scores indicating positive attitudes toward inclusion. Antonak and Larivee (1995) had reported a Cronbach's coefficient alpha homogeneity coefficient of .88 on this instrument, which was considered appropriate reliability for use in this study.

Three skill projects were also used to assess the participants' performance. During the first content unit of the course, all of the

students completed the IEP project described earlier. A scoring rubric based on the Gibb and Dyches (2000) guide was developed and used to evaluate the present levels of performance, goals, and objectives written by the participants. During the second and third units, all participants submitted written responses to questions regarding a case study from each unit. One case study focused on issues in the inclusion of students with learning disabilities in the regular classroom and the second case study addressed concerns about the Deaf community and least restrictive environments. Scoring rubrics were developed for the specific questions in each case study and student responses were evaluated on whether or not the responses were logical and supported by information from the readings.

The three skill projects were assessed by the instructor for purposes of deriving grades in the class and were evaluated separately for purposes of the study by the second, non-teaching researcher. Results of all pretests/posttests and rubric scores for the skill projects were not shared with the instructor until the semester had ended and participants' grades had been submitted.

The data gathered in the study were analyzed using SPSS 10.0 (1999). The knowledge and attitude survey results were compared using an analysis of variance (ANOVA) for repeated measures and t tests for independent means were used to analyze characteristics of the group participants and performances on the skills projects. A confidence level of .05 was employed throughout the study to determine significance.

**Table 5.** Means, Standard Deviations and *t*-Statistics for Traditional and Online Course Skills Projects

		Group		Obtained <i>t</i>
		Online ( <i>n</i> = 28)	Traditional ( <i>n</i> = 26)	
Skills Project				
IEP Project	M	47.39	49.08	-.82
	SD	9.18	5.12	
Case Study #1	M	4.82	4.50	1.04
	SD	1.12	1.14	
Case Study #2	M	4.54	4.00	1.66
	SD	1.20	1.16	

*Note:* No differences significant at the .05 level.

## Results

### Skills Projects

The second, non-teaching, researcher evaluated the present levels of performance, goals and objectives from the IEP Project and the responses to Case Studies #1 and #2 using the rubrics earlier described. A reliability check of 20% of the rubric scores was completed by two independent raters and strong inter-rater reliability was assumed (Cohen's Kappa = .85, .71, and .72 respectively). Means, standard deviations, and obtained *t* statistics for the IEP project and both case studies are presented in Table 5. No statistically significant differences were evident in students' overall performance on the assignments when taught traditionally or online. Students' performance on the IEP project was similar ( $t = -.82$ ,  $df = 52$ ,  $p > .05$ ) in the traditional section ( $M = 47.39$ ,  $SD = 9.18$ ) and the online section ( $M = 49.08$ ,  $SD = 5.12$ ). Performance on Case Study #1 was also equivalent ( $t = 1.04$ ,  $df = 52$ ,  $p > .05$ ) whether the course was taught traditionally ( $M = 4.82$ ,  $SD = 1.12$ ) or taught online ( $M = 4.50$ ,  $SD = 1.14$ ). The scores on Case Study #2 showed similar performances ( $t = 1.66$ ,  $df = 52$ ,  $p > .05$ ) when taught traditionally ( $M = 4.54$ ,  $SD = 1.20$ ) and taught online ( $M = 4.00$ ,  $SD = 1.16$ ).

### Knowledge and Attitude Pre and Posttests

An analysis of variance (ANOVA) for repeated measures examined the relationship

## Traditional-Online Comparison

Steinweg, Davis & Thomson

**Table 6.** ANOVA Results for Student Performance on Knowledge Test

Group		Occasion	
		Pretest	Posttest
Online ( <i>n</i> = 28)	M	26.25	32.75
	SD	4.56	5.39
Traditional ( <i>n</i> = 26)	M	25.15	30.15
	SD	3.37	4.76
Analysis of Variance Summary Table			
Source	MS	df	F
Group	91.90	1	2.80

*Note:* No differences significant at the .05 level.

between pretest and posttest performance on the knowledge and attitude measures across traditional and online courses. Table 3 represents the ANOVA for the knowledge measure for the online and traditional groups. An analysis of the mode of instruction revealed no statistically significant difference between the students' performances ( $F$ -ratio = 2.80,  $p > .05$ ). Table 4 represents the ANOVA for the attitude measure of the students participating in the online and traditional versions of the class. The range of possible scores on the attitude survey was 0–150 with 75 representing a neutral attitude toward inclusion. The posttest scores for the online students ranged from 56 to 116 and from 23 to 124 for the traditional group students. The mean scores of 90.04 and 87.00 respectively, reflect positive attitudes toward inclusion. An analysis of the mode of instruction revealed no statistically significant difference

**Table 7.** ANOVA Results for Student Responses to Attitude Survey

Group		Occasion	
		Pretest	Posttest
Online ( <i>n</i> = 27)	M	88.25	90.04
	SD	16.95	17.07
Traditional ( <i>n</i> = 26)	M	78.0	87.0
	SD	23.14	23.29
Analysis of Variance Summary Table			
Source	MS	df	F
Group	1263.93	1	1.77

*Note:* No differences significant at the .05 level.



**TESE, Volume 28, No. 1**  
Winter 2005

between the students' attitudes regarding inclusion ( $f = 1.77$ ,  $p > .05$ ).

### **Discussion**

The results of the assessments in this study indicate that there were no statistically significant differences in the changes in knowledge, the changes in dispositions, and in the skill performance of learners enrolled in the online and traditional sections of this introductory special education class. The consistency in the content presented and the structure of the online and traditional sections of this course would be a factor in the similar outcomes across sections because a purposeful attempt was made in the development of the online and traditional sections in this study to assure alignment of content and activities for the development of knowledge and skills. While the presentation format was different, the course objectives and the information and skill activities were the same. The students used the same textbooks, the IEP and case study assignments were the same, and the courses followed the same schedule of assignments. This does not mean that the instructor provided typed copies of lecture notes in the online classes. Rather, the online sections took advantage of the interactive nature of the web in the presentation of information. Both the traditional and online presentations of the course included student interaction in discussions as well as student presentations. In the online format of the course this was accomplished through the use of the Discussion Board function where students responded to prompts and the comments of their peers as well as presented information from their web searches. The change in knowledge scores was somewhat discouraging to the instructor due to the small increase in mean gain scores. The fact that there was no statistically significant difference between the groups calls into question the influence of access to resources (textbook, notes, etc.) in the online group's performance. Pretest/posttest attitude data indicated both positive and negative shifts in attitudes. We think these shifts may be due to several factors. Informal discussions in both the face-to-face and online classes suggested that some individuals with no prior

experience working with students with disabilities had unrealistically high expectations at the beginning. These expectations may have been tempered by students' experiences in the course. Similarly, other individuals entered the class with attitudes based on prior negative experiences. The course activities may have helped them see the positive aspects of including students with disabilities in their classes. The case study and IEP project results for each group suggested that all students applied information from the course in meaningful way to real word situations. The performances on these skills assessments were encouraging to the authors who have had to respond to skepticism about the validity of online instruction for skill development.

### **Limitations**

Despite the encouraging results of this study, it is important to consider the limitations. The study was quasi-experimental as random selection and assignment of participants to groups was not possible. There may be self-selection factors that enhance a participant's performance in their chosen learning environment that were uncontrollable. The majority of individuals involved in this study were adult learners currently working in schools so it would be important not to generalize the findings of this study to other populations.

### **Implications for Research, Policy, and Practice**

The findings of no statistically significant difference in the knowledge and attitude measures or in the skills project scores between online and traditional groups in this study contribute outcome data to the research base evaluating online instruction in the area of special education. The results of this study provide a venue for addressing the standards of accrediting bodies that require demonstration of the comparability of online and traditional instruction. It would be beneficial for other researchers to replicate this study with other instructors, students, and performance measures. Because this study involved students in an introductory course with a heavy emphasis on knowledge, it also

## Traditional-Online Comparison

Steinweg, Davis & Thomson

would be informative if additional research focused on other types of courses (i.e., methods courses, specialty content courses) in special education.

Although comparative studies done in the past have resulted in findings of no significant difference and some have questioned the need for further comparative studies, Gunwardena and McIsaac (2004) reported that the focus on evidence-based research by the U.S. Department of Education has led to renewed interest in media comparison studies. Therefore, it would be prudent for teacher educators to continue designing research to validate the online format for course delivery.

Future research should focus on linking the media options now possible online to the subject areas and skills development for which they are most effective. For example, research might be conducted with online classes that consider the effect of using video via CD on the students' understanding of critical issues, or the use of interactive online simulations to supplant hands-on activities, or different communication modes (discussion board, Quick Cam, or tablet PC) to enhance feedback. Studies investigating the effect of modifying instructional strategies within online courses would also be helpful for future course design.

Establishing student interaction is an important component to be considered in the development of online classes. "The concept of interaction is fundamental to the effectiveness of distance education programs as well as traditional ones (Gunwardena & McIsaac, 2004, p. 362). As faculty members develop online classes they need to focus on the objectives and the most effective technologies to accomplish those objectives in the online format, applying principles of instructional design in the development of both online and traditional classes.

The cumulative research findings of no significant difference between traditional and online presentation of courses paired with the need to increase the number of special education teachers provide strong indications for policy-makers and administrators regarding development of future courses and programs. Expansion of classes in the online format can be achieved with lower costs without

the need for increased buildings. This would be an effective and efficient way for universities to meet the increasing need to expand learning opportunities for students in remote locations and address the shortage of special education in rural areas. An example would be the East Carolina University (ECU) program that takes advantage of online instruction in partnering with community colleges to provide teacher education programs for individuals who would like to become teachers. The flexibility of online instruction allows these individuals to take special education licensure courses without moving or lengthy commutes to ECU's campus. Rural school systems then have the benefit of being able to hire highly qualified teachers who want to continue to live and work in their rural communities. In addition, the opportunity to communicate online with a wider range of individuals helps to provide these, and other learners, with a more global experience (M. Sheerer, personal communication, July 4, 2004).

Distance education can be an efficient way to deliver education for some students. Research supports online learning as a viable alternative in the continuum of educational options and administrators and policy makers should consider online learning as one of many possible ways for colleges and universities to deliver coursework. The need for certified special education teachers and the demand for online classes to provide the necessary coursework in an easily accessible manner will likely continue to grow. Thus teacher educators must generate the research that identifies best practices for online course delivery in special education and apply the research findings to course and program development.

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**TESE, Volume 28, No. 1**  
Winter 2005

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### Traditional-Online Comparison

Steinweg, Davis & Thomson

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